

Date: 3 June 1999  
 To: Bechtel Hanford, Inc. (technical representative)  
 From: TechLaw, Inc.  
 Project: 300-FF-1 North Process Pond  
 Subject: Radiochemistry - Data Package No. H0360-TNU (SDG No. H0360)

**RECEIVED**  
 APR 25 2000

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0360-TNU which was prepared by Thermo NUtech (TNU). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
BOV024	03/12/99	Soil	C	See note 1
BOV025	03/12/99	Soil	C	See note 1
BOV026	03/12/99	Soil	C	See note 1
BOV027	03/12/99	Soil	C	See note 1
BOV028	03/12/99	Soil	C	See note 1
BOV029	03/12/99	Soil	C	See note 1
BOV030	03/12/99	Soil	C	See note 1
BOV031	03/12/99	Soil	C	See note 1
BOV032	03/12/99	Soil	C	See note 1
BOV033	03/12/99	Soil	C	See note 1
BOV034	03/12/99	Soil	C	See note 1
BOV035	03/12/99	Soil	C	See note 1

1 - Gamma spectroscopy; isotopic uranium.

Data validation was conducted in accordance with the BHI validation statement of work. Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

## **DATA QUALITY OBJECTIVES**

- **Holding Times**

Sample data were assessed to determine whether the holding time requirements were met by the laboratory. The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- **Blanks**

### **Laboratory Blanks**

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are elevated to the MDA and qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable.

- **Accuracy**

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample recovery range is 70% to 130% while that for a matrix spike sample is 60% to 140%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

All accuracy results were acceptable.

- **Precision**

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the CRDL and the RPD is less than 35 percent, the results are acceptable. If either activities are less than five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

All duplicate results were acceptable.

- **Detection Levels**

Reported analytical detection levels are compared the contract specified MDA to ensure that laboratory detection levels meet the required criteria. The reported detection limit exceeded the MDA for the following: Europium-155 in samples BOV030, BOV031, and BOV034. Under the BHI statement of work, no qualification is required. All other reported laboratory MDAs were at or below the analyte-specific MDA.

- **Completeness**

Data Package No. H0360 (SDG No. H0360) was submitted for validation and verified for completeness. The completion rate was 100%.

## **MAJOR DEFICIENCIES**

None found.

## **MINOR DEFICIENCIES**

None found.

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## REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

**Appendix 1**  
**Glossary of Data Reporting Qualifiers**

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Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ - Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

## **Appendix 2**

### **Summary of Data Qualification**

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# DATA QUALIFICATION SUMMARY

SDG: H0360	REVIEWER: TLI	DATE: 6/3/99	PAGE <u>1</u> OF <u>1</u>
COMMENTS: No qualifiers assigned			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON

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### **Appendix 3**

#### **Qualified Data Summary and Annotated Laboratory Reports**

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[illegible]

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[illegible]

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SAMPLE DELIVERY GROUP H0360

N903094-01

BOV024

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG-H0360
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-01</u>	Client sample id <u>BOV024</u>	
Dept sample id <u>7099-001</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 10:00</u>	
% solids <u>97.2</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	17.7	2.4	0.31	0.30		U
Uranium 235	15117-96-1	1.86	0.44	0.16	0.30		U
Uranium 238	U-238	15.0	2.1	0.29	0.30		U
Potassium 40	13966-00-2	8.91	0.23	0.089			GAM
Cobalt 60	10198-40-0	0.090	0.012	0.011	0.050		GAM
Cesium 137	10045-97-3	U		0.010	0.050	U	GAM
Europium 152	14683-23-9	U		0.026	0.10	U	GAM
Europium 154	15585-10-1	U		0.033	0.10	U	GAM
Europium 155	14391-16-3	U		0.033	0.10	U	GAM
Radium 226	13982-63-3	0.381	0.021	0.020	0.10		GAM
Radium 228	15262-20-1	0.531	0.048	0.046	0.20		GAM
Thorium 228	14274-82-9	0.475	0.015	0.014			GAM
Thorium 232	TH-232	0.531	0.048	0.046			GAM
Americium 241	14596-10-2	U		0.036		U	GAM
Uranium 238	U-238	2.89	1.4	1.5			GAM
Uranium 235	15117-96-1	0.087	0.034	0.050			GAM

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4/3/99

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

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SAMPLE DELIVERY GROUP H0360

N903094-02

BOV025

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0360</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-02</u>	Client sample id <u>BOV025</u>	
Dept sample id <u>7099-002</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 10:12</u>	
% solids <u>96.7</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	21.0	2.2	0.26	0.30		U
Uranium 235	15117-96-1	2.55	0.42	0.095	0.30		U
Uranium 238	U-238	17.8	1.9	0.25	0.30		U
Potassium 40	13966-00-2	9.03	0.25	0.12			GAM
Cobalt 60	10198-40-0	0.066	0.011	0.012	0.050		GAM
Cesium 137	10045-97-3	0.031	0.011	0.012	0.050	J	GAM
Europium 152	14683-23-9	U		0.026	0.10	U	GAM
Europium 154	15585-10-1	U		0.034	0.10	U	GAM
Europium 155	14391-16-3	U		0.034	0.10	U	GAM
Radium 226	13982-63-3	0.384	0.022	0.021	0.10		GAM
Radium 228	15262-20-1	0.546	0.049	0.048	0.20		GAM
Thorium 228	14274-82-9	0.502	0.015	0.014			GAM
Thorium 232	TH-232	0.546	0.049	0.048			GAM
Americium 241	14596-10-2	U		0.038		U	GAM
Uranium 238	U-238	2.30	0.91	1.2			GAM
Uranium 235	15117-96-1	0.113	0.041	0.056			GAM

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

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SAMPLE DELIVERY GROUP H0360

N903094-03

B0V026

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0360</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-03</u>	Client sample id <u>B0V026</u>	
Dept sample id <u>7099-003</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 10:20</u>	
% solids <u>97.3</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	4.53	0.69	0.13	0.30		U
Uranium 235	15117-96-1	0.263	0.13	0.13	0.30	J	U
Uranium 238	U-238	4.09	0.64	0.13	0.30		U
Potassium 40	13966-00-2	8.46	0.39	0.22			GAM
Cobalt 60	10198-40-0	U		0.020	0.050	U	GAM
Cesium 137	10045-97-3	U		0.017	0.050	U	GAM
Europium 152	14683-23-9	U		0.041	0.10	U	GAM
Europium 154	15585-10-1	U		0.067	0.10	U	GAM
Europium 155	14391-16-3	U		0.038	0.10	U	GAM
Radium 226	13982-63-3	0.402	0.034	0.031	0.10		GAM
Radium 228	15262-20-1	0.703	0.11	0.092	0.20		GAM
Thorium 228	14274-82-9	0.494	0.021	0.020			GAM
Thorium 232	TH-232	0.703	0.11	0.092			GAM
Americium 241	14596-10-2	U		0.023		U	GAM
Uranium 238	U-238	U		2.3		U	GAM
Uranium 235	15117-96-1	U		0.065		U	GAM

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

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SAMPLE DELIVERY GROUP H0360

N903094-04

B0V027

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG-H0360
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-04</u>	Client sample id <u>B0V027</u>	
Dept sample id <u>7099-004</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 10:40</u>	
% solids <u>97.1</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	95.0	9.5	0.57	0.30		U
Uranium 235	15117-96-1	12.2	1.5	0.11	0.30		U
Uranium 238	U-238	79.0	8.0	0.54	0.30		U
Potassium 40	13966-00-2	8.63	0.38	0.20			GAM
Cobalt 60	10198-40-0	0.063	0.022	0.023	0.050		GAM
Cesium 137	10045-97-3	U		0.028	0.050	U	GAM
Europium 152	14683-23-9	U		0.050	0.10	U	GAM
Europium 154	15585-10-1	U		0.062	0.10	U	GAM
Europium 155	14391-16-3	U		0.072	0.10	U	GAM
Radium 226	13982-63-3	0.398	0.034	0.035	0.10		GAM
Radium 228	15262-20-1	0.495	0.089	0.099	0.20		GAM
Thorium 228	14274-82-9	0.499	0.024	0.026			GAM
Thorium 232	TH-232	0.495	0.089	0.099			GAM
Americium 241	14596-10-2	U		0.12		U	GAM
Uranium 238	U-238	21.8	3.0	3.0			GAM
Uranium 235	15117-96-1	0.960	0.10	0.12			GAM

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

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SAMPLE DELIVERY GROUP H0360

N903094-05

BOV028

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG-H0360
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-05</u>	Client sample id <u>BOV028</u>	
Dept sample id <u>7099-005</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 11:07</u>	
% solids <u>97.2</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	2.52	0.41	0.080	0.30		U
Uranium 235	15117-96-1	0.126	0.076	0.096	0.30	J	U
Uranium 238	U-238	2.98	0.45	0.080	0.30		U
Potassium 40	13966-00-2	8.55	0.24	0.11			GAM
Cobalt 60	10198-40-0	U		0.010	0.050	U	GAM
Cesium 137	10045-97-3	U		0.009	0.050	U	GAM
Europium 152	14683-23-9	U		0.025	0.10	U	GAM
Europium 154	15585-10-1	U		0.036	0.10	U	GAM
Europium 155	14391-16-3	U		0.031	0.10	U	GAM
Radium 226	13982-63-3	0.368	0.020	0.018	0.10		GAM
Radium 228	15262-20-1	0.480	0.046	0.044	0.20		GAM
Thorium 228	14274-82-9	0.453	0.015	0.013			GAM
Thorium 232	TH-232	0.480	0.046	0.044			GAM
Americium 241	14596-10-2	U		0.035		U	GAM
Uranium 238	U-238	1.15	1.1	1.4		U	GAM
Uranium 235	15117-96-1	0.056	0.037	0.052			GAM

300-FF-1 North Process Pond

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>



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SAMPLE DELIVERY GROUP H0360

N903094-06

B0V029

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG-H0360
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-06</u>	Client sample id <u>B0V029</u>	
Dept sample id <u>7099-006</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 11:25</u>	
% solids <u>97.3</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	13.3	1.5	0.23	0.30		U
Uranium 235	15117-96-1	1.95	0.35	0.097	0.30		U
Uranium 238	U-238	11.9	1.3	0.22	0.30		U
Potassium 40	13966-00-2	9.12	0.32	0.17			GAM
Cobalt 60	10198-40-0	0.103	0.022	0.020	0.050		GAM
Cesium 137	10045-97-3	U		0.016	0.050	U	GAM
Europium 152	14683-23-9	U		0.036	0.10	U	GAM
Europium 154	15585-10-1	U		0.056	0.10	U	GAM
Europium 155	14391-16-3	U		0.046	0.10	U	GAM
Radium 226	13982-63-3	0.431	0.034	0.030	0.10		GAM
Radium 228	15262-20-1	0.548	0.079	0.078	0.20		GAM
Thorium 228	14274-82-9	0.509	0.018	0.017			GAM
Thorium 232	TH-232	0.548	0.079	0.078			GAM
Americium 241	14596-10-2	U		0.021		U	GAM
Uranium 238	U-238	U		2.2		U	GAM
Uranium 235	15117-96-1	0.122	0.042	0.057			GAM

300-FF-1 North Process Pond

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0360

N903094-07

B0V030

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0360</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-07</u>	Client sample id <u>B0V030</u>	
Dept sample id <u>7099-007</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 12:55</u>	
% solids <u>96.1</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	115	5.0	0.21	0.30		U
Uranium 235	15117-96-1	9.93	0.53	0.020	0.30		U
Uranium 238	U-238	101	4.4	0.20	0.30		U
Potassium 40	13966-00-2	10.9	0.37	0.20			GAM
Cobalt 60	10198-40-0	0.165	0.024	0.024	0.050		GAM
Cesium 137	10045-97-3	0.210	0.024	0.026	0.050		GAM
Europium 152	14683-23-9	U		0.053	0.10	U	GAM
Europium 154	15585-10-1	U		0.063	0.10	U	GAM
Europium 155	14391-16-3	U		0.27	0.10	U	GAM
Radium 226	13982-63-3	0.468	0.036	0.038	0.10		GAM
Radium 228	15262-20-1	0.837	0.10	0.11	0.20		GAM
Thorium 228	14274-82-9	0.873	0.025	0.026			GAM
Thorium 232	TH-232	0.837	0.10	0.11			GAM
Americium 241	14596-10-2	U		0.32		U	GAM
Uranium 238	U-238	47.8	3.2	2.9			GAM
Uranium 235	15117-96-1	2.12	0.11	0.13			GAM

300-FF-1 North Process Pond

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Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

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TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0360

N903094-08

BOV031

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG-H0360
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-08</u>	Client sample id <u>BOV031</u>	
Dept sample id <u>7099-008</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 13:15</u>	
% solids <u>96.8</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	56.6	2.6	0.17	0.30		U
Uranium 235	15117-96-1	5.85	0.36	0.021	0.30		U
Uranium 238	U-238	43.7	2.0	0.16	0.30		U
Potassium 40	13966-00-2	10.1	0.21	0.088			GAM
Cobalt 60	10198-40-0	0.269	0.015	0.012	0.050		GAM
Cesium 137	10045-97-3	0.236	0.012	0.012	0.050		GAM
Europium 152	14683-23-9	U		0.025	0.10	U	GAM
Europium 154	15585-10-1	U		0.030	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.11</u>	0.10	U	GAM
Radium 226	13982-63-3	0.420	0.019	0.019	0.10		GAM
Radium 228	15262-20-1	0.685	0.045	0.044	0.20		GAM
Thorium 228	14274-82-9	0.646	0.014	0.013			GAM
Thorium 232	TH-232	0.685	0.045	0.044			GAM
Americium 241	14596-10-2	U		0.047		U	GAM
Uranium 238	U-238	14.0	1.5	1.6			GAM
Uranium 235	15117-96-1	0.628	0.044	0.057			GAM

300-FF-1 North Process Pond

*pkc*  
6/3/99

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

000019

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0360

N903094-09

BOV032

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG-H0360
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-09</u>	Client sample id <u>BOV032</u>	
Dept sample id <u>7099-009</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 13:40</u>	
* solids <u>97.4</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	45.1	2.0	0.15	0.30		U
Uranium 235	15117-96-1	4.94	0.32	0.021	0.30		U
Uranium 238	U-238	34.9	1.6	0.15	0.30		U
Potassium 40	13966-00-2	9.06	0.42	0.21			GAM
Cobalt 60	10198-40-0	0.171	0.025	0.023	0.050		GAM
Cesium 137	10045-97-3	0.136	0.024	0.027	0.050		GAM
Europium 152	14683-23-9	U		0.055	0.10	U	GAM
Europium 154	15585-10-1	U		0.067	0.10	U	GAM
Europium 155	14391-16-3	U		0.065	0.10	U	GAM
Radium 226	13982-63-3	0.429	0.042	0.042	0.10		GAM
Radium 228	15262-20-1	0.573	0.097	0.10	0.20		GAM
Thorium 228	14274-82-9	0.582	0.026	0.027			GAM
Thorium 232	TH-232	0.573	0.097	0.10			GAM
Americium 241	14596-10-2	U		0.30		U	GAM
Uranium 238	U-238	10.9	3.3	3.4			GAM
Uranium 235	15117-96-1	0.319	0.085	0.11			GAM

300-FF-1 North Process Pond

*JRC*  
6/3/99

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

000020

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0360

N903094-10

B0V033

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG-H0360
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-10</u>	Client sample id <u>B0V033</u>	
Dept sample id <u>7099-010</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 13:55</u>	
% solids <u>95.4</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	35.6	3.9	0.30	0.30		U
Uranium 235	15117-96-1	2.68	0.48	0.12	0.30		U
Uranium 238	U-238	35.2	3.9	0.29	0.30		U
Potassium 40	13966-00-2	12.4	0.31	0.13			GAM
Cobalt 60	10198-40-0	U		0.013	0.050	U	GAM
Cesium 137	10045-97-3	0.133	0.014	0.015	0.050		GAM
Europium 152	14683-23-9	U		0.034	0.10	U	GAM
Europium 154	15585-10-1	U		0.043	0.10	U	GAM
Europium 155	14391-16-3	U		0.052	0.10	U	GAM
Radium 226	13982-63-3	0.504	0.027	0.025	0.10		GAM
Radium 228	15262-20-1	0.717	0.061	0.060	0.20		GAM
Thorium 228	14274-82-9	0.674	0.020	0.019			GAM
Thorium 232	TH-232	0.717	0.061	0.060			GAM
Americium 241	14596-10-2	U		0.064		U	GAM
Uranium 238	U-238	17.6	1.9	1.8			GAM
Uranium 235	15117-96-1	0.587	0.066	0.084			GAM

300-FF-1 North Process Pond

*RK*  
*6/3/99*

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

000021

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0360

N903094-11

B0V034

DATA SHEET

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0360</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-11</u>	Client sample id <u>B0V034</u>	
Dept sample id <u>7099-011</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 14:10</u>	
* solids <u>95.2</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	147	11	<u>0.49</u>	0.30		U
Uranium 235	15117-96-1	15.2	1.4	0.066	0.30		U
Uranium 238	U-238	119	9.2	<u>0.46</u>	0.30		U
Potassium 40	13966-00-2	10.2	0.26	0.13			GAM
Cobalt 60	10198-40-0	0.746	0.026	0.017	0.050		GAM
Cesium 137	10045-97-3	0.592	0.022	0.020	0.050		GAM
Europium 152	14683-23-9	U		0.042	0.10	U	GAM
Europium 154	15585-10-1	U		0.041	0.10	U	GAM
Europium 155	14391-16-3	U		<u>0.24</u>	0.10	U	GAM
Radium 226	13982-63-3	0.499	0.029	0.030	0.10		GAM
Radium 228	15262-20-1	1.06	0.074	0.074	0.20		GAM
Thorium 228	14274-82-9	0.996	0.022	0.022			GAM
Thorium 232	TH-232	1.06	0.074	0.074			GAM
Americium 241	14596-10-2	U		0.45		U	GAM
Uranium 238	U-238	56.9	2.8	2.5			GAM
Uranium 235	15117-96-1	2.42	0.091	0.11			GAM

300-FF-1 North Process Pond

*RK*  
*6/3/99*

000022

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

**TMA / RICHMOND**  
**SAMPLE DELIVERY GROUP H0360**

N903094-12

B0V035

**DATA SHEET**

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SDG- <u>H0360</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-12</u>	Client sample id <u>B0V035</u>	
Dept sample id <u>7099-012</u>	Location/Matrix <u>300 FF-1 NPP</u>	<u>SOLID</u>
Received <u>03/19/99</u>	Collected <u>03/12/99 14:35</u>	
% solids <u>96.5</u>	Custody/SAF No <u>B99-046-02</u>	<u>B99-046</u>

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	73.2	3.4	0.18	0.30		U
Uranium 235	15117-96-1	5.90	0.37	0.023	0.30		U
Uranium 238	U-238	66.1	3.1	0.17	0.30		U
Potassium 40	13966-00-2	9.89	0.44	0.23			GAM
Cobalt 60	10198-40-0	0.142	0.027	0.029	0.050		GAM
Cesium 137	10045-97-3	0.242	0.027	0.029	0.050		GAM
Europium 152	14683-23-9	U		0.063	0.10	U	GAM
Europium 154	15585-10-1	U		0.067	0.10	U	GAM
Europium 155	14391-16-3	U		0.088	0.10	U	GAM
Radium 226	13982-63-3	0.473	0.042	0.043	0.10		GAM
Radium 228	15262-20-1	0.711	0.090	0.098	0.20		GAM
Thorium 228	14274-82-9	0.678	0.030	0.031			GAM
Thorium 232	TH-232	0.711	0.090	0.098			GAM
Americium 241	14596-10-2	U		0.30		U	GAM
Uranium 238	U-238	27.2	3.3	3.3			GAM
Uranium 235	15117-96-1	1.24	0.12	0.15			GAM

300-FF-1 North Process Pond

*RRC*  
*6/3/99*

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>05/26/99</u>

000023

## **Appendix 4**

### **Laboratory Narrative and Chain-of-Custody Documentation**



## Case Narrative

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### 1.0 GENERAL

Bechtel Hanford Inc. Sample Delivery Group H0360 is comprised of twenty solid (soil) samples designated under SAF No. B99-0546 with a Project Designation of: 300-FF-1 North Process Pond.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the TNU Sample Receipt Checklist. The individual nuclide results were faxed to Bechtel Hanford on the listed date in the table below.

Nuclide	Date Faxed
Uranium	4/29/99 (7103 and 7099)
Gross Alpha/Beta	5/4/99 (7103) and 5/6/99 (7099)
Strontium	5/6/99 (7099)
Tritium	5/13/99 (7099)

### 2.0 ANALYSIS NOTES

#### 2.1 Gamma Scan Analyses

No problems were encountered during the processing of the samples.

#### 2.2 Isotopic Uranium Analyses

No problems were encountered during the processing of the samples.

#### 2.3 Total Strontium Analyses

The recovery for the laboratory control sample (LCS) was low at 75 percent. This may be associated with the low recovery observed for the LCS.

#### 2.4 Tritium Analyses

No problems were encountered during the processing of the samples.

Bechtel Hanford Inc.		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>						B99-046-02		Page 1 of 2	
Collector Doug Bowers		Company Contact Jeff Lerch		Telephone No. 373-5904		Project Coordinator TRENT, SJ		Price Code		Data Turnaround <b>15 Days</b>	
Project Designation 300-FF-1 North Process Pond		Sampling Location 300 FF-1 North process pond		SAF No. B99-046							
Ice Chest No. <b>ERC 96 053</b>		Field Logbook No. <del>EFL 11325</del> <b>EL 11325-2 5803-142</b>		Method of Shipment Fed Ex							
Shipped To TMA/RECR <b>878 7-12-99</b>		Offsite Property No. <b>A 990 085</b>		Bill of Lading/Air Bill No. <b>42357952 3482</b>							
				COA <b>RNPALES 2600</b>							

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	Cool 4C	Cool 4C	None	None				
	Type of Container	aG	aG	aG	aG	G/P	aG				
	No. of Container(s)	1	1	1	1	1	1				
	Special Handling and/or Storage	Volume	60mL	60mL	250mL	250mL	250mL	1000mL			

SAMPLE ANALYSIS	Activity Scan	Isotopic Uranium	PCBs - 8082	Semi-VOA - 8270A (TCL) (Benzo(a)pyrene, Chrysene)	ICP Metals - 6010A (Add-on) (Arsenic, Thallium)	Gamma Spectroscopy (Cobalt-60)				
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Sample No.	Matrix *	Sample Date	Sample Time								
BOV024	Soil	3-12-99	1000	X	X					X	BIND36
BOV025	Soil	3-12-99	1012	X	X					X	BIND37
✓ BOV026	Soil	3-12-99	1020	X	X					X	BIND38
✓ BOV027	Soil	3-12-99	1040	X	X					X	BIND39
✓ BOV028	Soil	3-12-99	1107	X	X					X	BIND40

CHAIN OF POSSESSION	Sign/Print Names	SPECIAL INSTRUCTIONS	Matrix *
Relinquished By <b>D BOWERS FOR</b> Date/Time	Received By <b>FED EX</b> Date/Time		Soil Water Vapor Other Solid Other Liquid
<b>S. IGALLA</b> <b>3-18-99 1200</b>	<b>3-18-99</b>		
Relinquished By <b>Fed Ex</b> Date/Time	Received By <b>JR Conzo</b> Date/Time		
<b>2-19-99 10:00</b>	<b>3-19-99 10:00</b>		
Relinquished By	Received By		
Relinquished By	Received By		

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposed Method	Disposed By	Date/Time

00000000

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST				B99-046-02		Page 2 of 3	
Collector Doug Bowers		Company Contact Jeff Lerch		Telephone No. 373-5904		Project Coordinator TRENT, SJ		Price Code	
Project Designation 300-FF-1 North Process Pond		Sampling Location 300 FF-1 North process pond		SAF No. B99-046				Data Turnaround 15 Days	
Ice Chest No. ERC 96 053		Field Logbook No. EL 1315-2 878 3-1-99		Method of Shipment Fed Ex					
Shipped To TMA/REGRA 3-12-99		Offsite Property No. A990 085		Bill of Lading/Air Bill No. 423579523482					
				COA RNPACS 2600					

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	Cool 4C	Cool 4C	None	None				
	Type of Container	aG	aG	aG	aG	G/P	aG				
	No. of Container(s)	1	1	1	1	1	1				
	Volume	60mL	60mL	250mL	250mL	250mL	1000mL				
Special Handling and/or Storage											

SAMPLE ANALYSIS				Activity Scan	Isotopic Uranium	PCBs - 8082	Semi-VOA - 8270A (TCL) (Benzo(a)pyrene, Chrysene)	ICP Metals - 6010A (Add-on) (Arsenic, Thallium)	Gamma Spectroscopy (Cobalt-60)				
Sample No.	Matrix *	Sample Date	Sample Time										
BOV029	Soil	3-12-99	1125	X	X				X				BLN041
BOV030	Soil	3-12-99	1255	X	X				X				BLN042
BOV031	Soil	3-12-99	1315	X	X				X				BLN043
BOV032	Soil	3-12-99	1340	X	X				X				BLN044
BOV033	Soil	3-12-99	1355	X	X				X				BLN045

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS				Matrix *	
Relinquished By	Date/Time	Received By	Date/Time					Soil Water Vapor Other Solid Other Liquid	
SIGALE	3-18-99 1200	FED EX	3-18-99						
Relinquished By	Date/Time	Received By	Date/Time						
Fed Ex	3-18-99 10:15	JP LORAN	3-19-99						
Relinquished By	Date/Time	Received By	Date/Time						
Relinquished By	Date/Time	Received By	Date/Time						
LABORATORY SECTION		Received By		Title				Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time	

000027

LABORATORY SECTION	Received By	Title	Date/Time
	Disposed By		Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method		

**Appendix 5**  
**Data Validation Supporting Documentation**

## RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<u>C</u>	D	E
PROJECT: 300-FF-1			DATA PACKAGE: H0360		
VALIDATOR: TLI		LAB: TNU		DATE: 6/1/99	
CASE:			SDG: H0360		
ANALYSES PERFORMED					
<input type="checkbox"/> Gross Alpha/Beta	<input type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input checked="" type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22	<input type="checkbox"/> Tritium	<input type="checkbox"/>		
SAMPLES/MATRIX Soil					
BOV024 BOV025 BOV026 BOV027 BOV028					
BOV029 BOV030 BOV031 BOV032 BOV033					
BOV034 BOV035					

1. Completeness . . . . . ☒ N/ATechnical verification forms present? . . . . . ☒ Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Initial Calibration . . . . . ☒ N/AInstruments/detectors calibrated within  
one year of sample analysis? . . . . . Yes No N/A

Initial calibration acceptable? . . . . . Yes No N/A

Standards NIST traceable? . . . . . Yes No N/A

Standards Expired? . . . . . Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

CA# 000030

3. Continuing Calibration . . . . . ☒ N/A

Calibration checked within one week of sample analysis? . . . Yes No N/A

Calibration check acceptable? . . . . . Yes No N/A

Calibration check standards NIST traceable? . . . . . Yes No N/A

Calibration check standards expired? . . . . . Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Blanks . . . . . ☐ N/A

Method blank analyzed? . . . . . Yes No N/A

Method blank results acceptable? . . . . . Yes No N/A

Analytes detected in method blank? . . . . . Yes No N/A

Field blank(s) analyzed? . . . . . Yes No N/A

Field blank results acceptable? . . . . . Yes No N/A

Analytes detected in field blank(s)? . . . . . Yes No N/A

Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: NO Random or Shown blank / J / A data record

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Matrix Spikes . . . . . ☒ N/A

Matrix spike analyzed? . . . . . Yes No N/A

Spike recoveries acceptable? . . . . . Yes No N/A

Spike source traceable? . . . . . Yes No N/A

Spike source expired? . . . . . Yes No N/A

Transcription/Calculation Errors? . . . . . Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. Laboratory Control Samples . . . . . ☐ N/ALCS analyzed? . . . . . Yes No N/ALCS recoveries acceptable? . . . . . Yes No N/ALCS traceable? . . . . . Yes No N/ATranscription/Calculation Errors? . . . . . Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. Chemical Recovery . . . . . ☐ N/AChemical carrier added? . . . . . Yes No N/AChemical recovery acceptable? . . . . . Yes No N/AChemical carrier traceable? . . . . . Yes No N/AChemical carrier expired? . . . . . Yes No N/ATranscription/Calculation errors? . . . . . Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8. Duplicates . . . . . ☐ N/ADuplicates Analyzed? . . . . . Yes No N/ARPD Values Acceptable? . . . . . Yes No N/ATranscription/Calculation Errors? . . . . . Yes No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



9. Field QC Samples . . . . . ☐ N/AField duplicate sample(s) analyzed? . . . . . Yes ☒ No ☐ N/AField duplicate RPD values acceptable? . . . . . Yes ☐ No ☒ N/AField split sample(s) analyzed? . . . . . Yes ☒ No ☐ N/AField split RPD values acceptable? . . . . . Yes ☐ No ☒ N/APerformance audit sample(s) analyzed? . . . . . Yes ☒ No ☐ N/APerformance audit sample results acceptable? . . . . . Yes ☐ No ☒ N/A

Comments: \_\_\_\_\_

## 10. Holding Times

Are sample holding times acceptable? . . . . . ☒ Yes ☐ No ☐ N/A

Comments: \_\_\_\_\_

11. Results and Detection Limits (Levels D & E) . . . . . ☐ N/AResults reported for all required sample analyses? . . . . . ☒ Yes ☐ No ☐ N/AResults supported in raw data? . . . . . Yes ☐ No ☒ N/AResults Acceptable? . . . . . ☒ Yes ☐ No ☐ N/ATranscription/Calculation errors? . . . . . Yes ☐ No ☒ N/AMDA's meet required detection limits? . . . . . Yes ☒ No ☐ N/ATranscription/calculation errors? . . . . . Yes ☐ No ☒ N/AComments: 30 Ev-1553134

Date: 3 June 1999  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 300-FF-1 North Process Pond  
Subject: PCB - Data Package No. H0360-RLN (SDG No. H0360)

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0360-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
BOV024	03/12/99	Soil	C	EPA 8082
BOV025	03/12/99	Soil	C	EPA 8082
BOV026	03/12/99	Soil	C	EPA 8082
BOV027	03/12/99	Soil	C	EPA 8082
BOV028	03/12/99	Soil	C	EPA 8082
BOV029	03/12/99	Soil	C	EPA 8082
BOV030	03/12/99	Soil	C	EPA 8082
BOV031	03/12/99	Soil	C	EPA 8082
BOV032	03/12/99	Soil	C	EPA 8082
BOV033	03/12/99	Soil	C	EPA 8082
BOV034	03/12/99	Soil	C	EPA 8082
BOV035	03/12/99	Soil	C	EPA 8082

Data validation was conducted in accordance with the BHI validation statement of work. Appendices 1 through 5 provide the following information as indicated below:

000001

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

## **DATA QUALITY OBJECTIVES**

- **Holding Times**

Sample data were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR".

Due to the holding time being exceeded by less than twice the limit, all results for sample BOV026 were qualified as estimates and flagged "J".

Holding times were met for all other samples.

- **Blanks**

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than CRQL. If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than CRQL, the result is qualified as undetected and elevated to the CRQL.

All method blank target compound results were acceptable.

- Accuracy

#### Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike analyses are performed in duplicate and must be within either control limits established by the laboratory or 50% to 150% if no laboratory limits are established. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Nondetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a MS/MSD analysis, all results in sample BOV026 were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate results were acceptable.

#### Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Nondetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Nondetected compounds with surrogate recoveries above the upper control limit require no qualification.

Due to a surrogate recovery outside QC limits, all results in sample BOV025 were qualified as estimates and flagged "J".

Due to a surrogate recovery outside QC limits (dilluted out), all results in samples BOV030, BOV034 and BOV035 were qualified as estimates and flagged "J".

All other surrogate recovery results were acceptable.

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the lack of a MS/MSD analysis, all results in sample BOV026 were qualified as estimates and flagged "J".

All other precision results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the CRQL to ensure that laboratory detection levels meet the required criteria. The reported detection limit for all analytes in all samples exceeded the CRQL. Under the BHI statement of work, no qualification is required.

- **Completeness**

Data Package No. H0360-RLN (SDG No. H0360) was submitted for validation and verified for completeness. The completion percentage was 100%.

**MAJOR DEFICIENCIES**

None found.

**MINOR DEFICIENCIES**

Due to a surrogate recovery outside QC limits, all results in sample BOV025 were qualified as estimates and flagged "J". Due to a surrogate recovery outside QC limits (dilluted out), all results in samples BOV030, BOV034 and BOV035 were qualified as estimates and flagged "J". Due to the holding time being exceeded by

less than twice the limit, all results in sample BOV026 were qualified as estimates and flagged "J". Due to the lack of a MS/MSD analysis, all results in sample BOV026 were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

## REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

## **Appendix 1**

### **Glossary of Data Reporting Qualifiers**

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N - Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).



## **Appendix 2**

### **Summary of Data Qualification**

000008

# DATA QUALIFICATION SUMMARY

SDG: H0360	REVIEWER: TLI	DATE: 6/3/99	PAGE <u>1</u> OF <u>1</u>
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
All	J	B0V026	Holding time exceeded
All	J	B0V025, B0V030, B0V034, B0V035	Surrogate recovery
All	J	B0V026	No MS/MSD analysis

000009

### **Appendix 3**

#### **Qualified Data Summary and Annotated Laboratory Reports**

[illegible]

000011

Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 04/05/99 09:44

RFW Batch Number: 9903L497

Client: TNU-HANFORD B99-046

Work Order: 10985001001 Page: 1

	Cust ID:	B0V024	B0V024	B0V024	B0V025	B0V026	B0V027
Sample Information	RFW#:	001	001 MS	001 MSD	002	003	004
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	1.00	1.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	108 %	108 %	112 %	130 * %	102 %	108 %
	Decachlorobiphenyl	118 %	104 %	119 %	109 %	95 %	91 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		34 U	34 U	34 U	35 U J	34 U J	34 U
Aroclor-1221		69 U	69 U	69 U	70 U	69 U	69 U
Aroclor-1232		34 U	34 U	34 U	35 U	34 U	34 U
Aroclor-1242		34 U	34 U	34 U	35 U	34 U	34 U
Aroclor-1248		34 U	34 U	34 U	35 U	34 U	34 U
Aroclor-1254		34 U	66 %	81 %	35 U	34 U	34 U
Aroclor-1260		34 U	34 U	34 U	35 U	34 U	34 U

	Cust ID:	B0V028	B0V029	B0V030	B0V031	B0V032	B0V033
Sample Information	RFW#:	005	006	007	008	009	010
	Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.:	1.00	1.00	5.00	2.00	1.00	1.00
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	110 %	110 %	D %	112 %	100 %	108 %
	Decachlorobiphenyl	102 %	105 %	D %	110 %	101 %	112 %
		fl	fl	fl	fl	fl	fl
Aroclor-1016		34 U	34 U	180 U J	70 U	35 U	35 U
Aroclor-1221		69 U	69 U	350 U	140 U	69 U	70 U
Aroclor-1232		34 U	34 U	180 U	70 U	35 U	35 U
Aroclor-1242		34 U	34 U	180 U	70 U	35 U	35 U
Aroclor-1248		34 U	34 U	870 U J	460 U	35 U	35 U
Aroclor-1254		34 U	34 U	180 U J	70 U	42	40
Aroclor-1260		34 U	34 U	180 U J	110	35 U	35 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.  
 %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \*= Outside of EPA CLP QC

*Handwritten signatures and dates:*  
 04/05/99  
 04/3/99

000012

Recra LabNet - Lionville Laboratory

PCBs by GC

Report Date: 04/05/99 09:44

RFW Batch Number: 9903L497

Client: TNU-HANFORD B99-046

Work Order: 10985001001 Page: 2

Cust ID:	BOV034	BOV035	BOV196	BOV198	BOV1B0	BOV1B2
Sample Information	RFW#: 011	012	013	014	015	016
	Matrix: SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.: 5.00	5.00	1.00	1.00	1.00	1.00
	Units: UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	D %	D %	102 %	110 %	92 %
	Decachlorobiphenyl	D %	D %	111 %	113 %	100 %
	-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----
Aroclor-1016	180 U J	170 U J	36 U	35 U	36 U	35 U
Aroclor-1221	360 U	350 U	71 U	70 U	73 U	70 U
Aroclor-1232	180 U	170 U	36 U	35 U	36 U	35 U
Aroclor-1242	180 U	170 U	36 U	35 U	36 U	35 U
Aroclor-1248	500 U	590 U	36 U	35 U	36 U	35 U
Aroclor-1254	180 U	170 U	36 U	35 U	100	35 U
Aroclor-1260	180 U	170 U	36 U	35 U	36 U	30 J

Cust ID:	BOV1B4	BOV1B6	PBLKGB	PBLKGB BS	PBLKGT	PBLKGT BS
Sample Information	RFW#: 017	018	99LE0345-MB1	99LE0345-MB1	99LE0387-MB1	99LE0387-MB1
	Matrix: SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	D.F.: 1.00	1.00	1.00	1.00	1.00	1.00
	Units: UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate:	Tetrachloro-m-xylene	105 %	68 %	102 %	128 * %	102 %
	Decachlorobiphenyl	114 %	79 %	108 %	133 * %	124 * %
	-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----	-----fl-----
Aroclor-1016	35 U	36 U	33 U	33 U	33 U	33 U
Aroclor-1221	71 U	71 U	67 U	67 U	67 U	67 U
Aroclor-1232	35 U	36 U	33 U	33 U	33 U	33 U
Aroclor-1242	35 U	36 U	33 U	33 U	33 U	33 U
Aroclor-1248	35 U	36 U	33 U	33 U	33 U	33 U
Aroclor-1254	35 U	36 U	33 U	84 %	33 U	93 %
Aroclor-1260	35 U	33 J	33 U	33 U	33 U	33 U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked.  
 % = Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. \* = Outside of EPA CLP QC

4/3/99 0405

000013

## **Appendix 4**

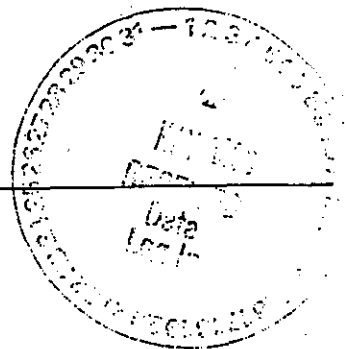
### **Laboratory Narrative and Chain-of-Custody Documentation**



**RECRA  
LabNet**

*a division of Recra Environmental, Inc.*

*Virtual Laboratories Everywhere*



**Recra LabNet Philadelphia  
Analytical Report**

**Client:** TNU-HANFORD B99-046  
**RFW#:** 9903L497  
**SDG/SAF#:** H0360/B99-046

**W.O.#:** 10985-001-001-9999-00  
**Date Received:** 03-19-99

**PCB**

The set of samples consisted of eighteen (18) soil samples collected on 03-11,12-99.

The samples and their associated QC samples were extracted on 03-22,31-99 and analyzed based on SW846, 3rd Edition on 03-25,26-99 and 04-02-99. The extraction procedure was based on method 3540 and the extracts were analyzed based on method 8082 for Aroclors only.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

1. The cooler temperature has been recorded on the chain-of-custody.
2. These samples were originally extracted within their required holding time. Sample B0V026 was lost during extraction and was re-extracted five days out of hold. All analyses were performed within hold time. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
3. The samples and their associated QC samples received a sulfuric acid and sulfur cleanup.
4. All method blanks were below the reporting limits for all target compounds.
5. Four (4) of forty-two (42) surrogate recoveries were outside acceptance criteria. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
6. All blank spike recoveries were within acceptance criteria.
7. All matrix spike recoveries were within acceptance criteria.
8. Several samples required instrument dilutions due to high concentrations of target analytes. Reporting limits have been adjusted to reflect the necessary dilutions.
9. All initial calibrations associated with this data set were within acceptance criteria.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 16 pages.

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10. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
11. Patterns for Aroclors 1248, 1254 and 1260 were identified in these samples. The reported Aroclor(s) was/were chosen based on the best pattern match and fit. Quantitation was performed using congeners common to both Aroclors to give the best overall total PCB concentration.

Per St Owen  
J. Michael Taylor  
Vice President  
Philadelphia Analytical Laboratory  
pefr:\group\data\pcb\03L-497.pcb

04-08-99  
Date



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002

# CONTAMINANT ANALYSIS REQUEST

B99-046-02

Page 1 of 2

Collector Doug Bowers	Company Contact Jeff Lerch	Telephone No. 373-5904	Project Coordinator TRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 300 FF-1 North Process Pond	Sampling Location 300 FF-1 North process pond	SAF No. B99-046			
Ice Chest No. SML-354	Field Logbook No. EFL1122-6 EL 1125-2 820 3-42	Method of Shipment Fed Ex			
Shipped To TMA/RECRA 528 3-12-99	Offsite Property No. A990489	Bill of Lading/Air Bill No. 423579523530			
COA RNPACS-2600					

POSSIBLE SAMPLE HAZARDS/REMARKS  Special Handling and/or Storage	Preservation	None	None	Cool 4C	Cool 4C	None	None				
	Type of Container	aG	aG	aG	aG	GP	aG				
	No. of Container(s)	1	1	1	1	1	1				
	Volume	60mL	60mL	250mL	250mL	250mL	1000mL				

SAMPLE ANALYSIS				Activity Scan	Isotopic Uranium	PCBs - 8082	Semi-VOA - 8270A (TCL) (Benz(a)pyrene, Chrysene)	ICP Metals - 6010A (Add-on) (Arsenic, Thallium)	Gamma Spectroscopy (Cobalt-60)				
Sample No.	Matrix *	Sample Date	Sample Time										
B0V024	Soil	3-12-99	1000			X							B0V036
B0V025	Soil	3-12-99	1012			X							B0V037
B0V026	Soil	3-12-99	1020			X							B0V038
B0V027	Soil	3-12-99	1040			X							B0V039
B0V028	Soil	3-12-99	1107			X							B0V040

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS		Matrix *	
Relinquished By	Date/Time	Received By	Date/Time	D. Bowers not available to relinquish due to schedule conflicts DTS 3/18/99  Stored in Refrig 2 @ 3728 3/11/99 thru 3/18/99		Soil Water Vapor Other Solid Other Liquid	
Relinquished By	Date/Time	Received By	Date/Time				
Relinquished By	Date/Time	Received By	Date/Time				
Relinquished By	Date/Time	Received By	Date/Time				
LABORATORY SECTION		Received By		Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time	

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-046-02

Page 2 of 2

Collector Doug Howers	Company Contact Jeff Lerch	Telephone No. 373-5904	Project Coordinator TRENT, SJ	Price Code	Data Turnaround 15 Days
Project Designation 300 FF-1 North Process Pond	Sampling Location 300 FF-1 North process pond	SAF No. B99-046			
Ice Chest No. SML-354	Field Logbook No. EFL-11334 EL 1125-2 878 3-1-99	Method of Shipment Fed Ex			
Shipped To TMA/RECRA 878 3-12-99	Offsite Property No. A990089	Bill of Lading/Air Bill No. 423579523530			
		COA PNPACS 2600			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	Cool 4C	Cool 4C	None	None				
	Type of Container	aG	aG	aG	aG	G/P	aG				
	No. of Container(s)	1	1	1	1	1	1				
	Special Handling and/or Storage	Volume	60mL	60mL	250mL	250mL	250mL	1000mL			

SAMPLE ANALYSIS				Activity Scan	Isotopic Uranium	PCBs - 8082	Semi-VOA - 8270A (TCL) (Benz(a)pyrene, Chrysene)	ICP Metals - 6010A (Add-on) (Arsenic, Thallium)	Gamma Spectroscopy (Cobalt-60)			
Sample No.	Matrix *	Sample Date	Sample Time									
B0V029	Soil	3-12-99	1125			X						B0V041
B0V030	Soil	3-12-99	1255			X						B0V042
B0V031	Soil	3-12-99	1315			X						B0V043
B0V032	Soil	3-12-99	1340			X						B0V044
B0V033	Soil	3-12-99	1355			X						B0V045

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS		Matrix *	
Relinquished By	Date/Time	Received By	Date/Time	<p>D. Bowers not available to relinquish due to schedule conflicts DAS 3/18/99</p> <p>Stored in ref. 2 @ 3728</p> <p>3/11/99</p>		<p>Soil</p> <p>Water</p> <p>Vapor</p> <p>Other Solid</p> <p>Other Liquid</p>	
Relinquished By	Date/Time	Received By	Date/Time				
Relinquished By	Date/Time	Received By	Date/Time				
Relinquished By	Date/Time	Received By	Date/Time				
LABORATORY SECTION		Received By		Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time	

# CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

B99-046-02

Page 1 of 1

Collector Doug Howers	Company Contact Jeff Lerch	Telephone No. 373-5904	Project Coordinator Trent, SJ	Price Code	Data Turnaround 15 Days
Project Designation 300 FF-1 North Process Pond	Sampling Location 300 FF-1 North process pond	SAF No. B99-046			
Ice Chest No. SMC-354	Field Logbook No. EFL-1132-6 EL 139T-2 87B 3-1-89	Method of Shipment Fed Ex			
Shipped To JMA/RECRA 87B 3-12-89	Offsite Property No. A990089	Bill of Lading/Air Bill No. 423579523530			
		COA 2NPACS 2600			

POSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	None	None	Cool 4C	Cool 4C	None	None				
	Type of Container	5G	5G	5G	5G	GP	5G				
	No. of Container(s)	1	1	1	1	1	1				
	Special Handling and/or Storage	Volume	60mL	60mL	250mL	250mL	250mL	1000mL			

SAMPLE ANALYSIS				Activity Scan	Isotopic Uranium	PCBs - B082	Semi-VOA - 8270A (TCL) (Benz(a)pyrene, Chrysene)	ICP Metals - 6010A (Add-on) (Arsenic, Thallium)	Gamma Spectroscopy (Cobalt-60)			
Sample No.	Matrix *	Sample Date	Sample Time									
B0V034	Soil	3-12-99	1410			X						B0V046
B0V035	Soil	3-12-99	1435			X						B0V047

CHAIN OF POSSESSION		Sign/Print Names		SPECIAL INSTRUCTIONS		Matrix *	
Relinquished By	Date/Time	Received By	Date/Time	<p>D. Bowers not available to relinquish samples due to schedule conflict DTS 3/18/99</p> <p>Stored in refrigerator 2 @ 372B</p> <p>3/1/99 - 3/18/99</p>		<p>Soil</p> <p>Water</p> <p>Vapor</p> <p>Other Solid</p> <p>Other Liquid</p>	
Relinquished By	Date/Time	Received By	Date/Time				
Relinquished By	Date/Time	Received By	Date/Time				
Relinquished By	Date/Time	Received By	Date/Time				
LABORATORY SECTION		Received By		Title		Date/Time	
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By		Date/Time	

**Appendix 5**  
**Data Validation Supporting Documentation**

000020

## PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	B	<b>C</b>	D	E
PROJECT: 300-FF+1			DATA PACKAGE: H0360		
VALIDATOR: TLI		LAB: RECAR		DATE: 6/1/99	
CASE:			SDG: H0360		
ANALYSES PERFORMED					
<input type="checkbox"/> CLP3/90	<input type="checkbox"/> SW-846 8080	<input type="checkbox"/> SW-846 8081	<input checked="" type="checkbox"/> 8082	<input type="checkbox"/>	<input type="checkbox"/>
SAMPLES/MATRIX 50.1					
BOV024 BOV025 BOV026 BOV027 BOV028					
BOV029 BOV030 BOV031 BOV032 BOV033					
BOV034 BOV035					

## 1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Is technical verification documentation present? . . . . . Yes No **N/A**Is a case narrative present? . . . . . **Yes** No N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 2. HOLDING TIMES

Are sample holding times acceptable? . . . . . Yes **No** N/A

Comments: BOV026 - 19 days to extraction I/UT

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 3. INSTRUMENT PERFORMANCE AND CALIBRATIONS

## 3.1 INSTRUMENT PERFORMANCE (METHOD 8080 AND 8081)

Are DDT retention times acceptable . . . . . Yes No **N/A**Are calibration standard retention times acceptable? . . . . . Yes No **N/A**Are DDT and endrin breakdowns acceptable? . . . . . Yes No **N/A**

*And* 000021

## PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are DBC retention times acceptable? . . . . . Yes No N/A  
Is the GC/MS tuning/performance check acceptable? . . . . . Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 3.2 CALIBRATIONS (METHOD 8080 AND 8081)

Are EVAL standard calibration factors and  
%RSD values acceptable? . . . . . Yes No N/A  
Are quantitation column calibration factor  
%RSD values acceptable? . . . . . Yes No N/A  
Were the analytical sequence requirements met? . . . . . Yes No N/A  
Are continuing calibration %D values acceptable? . . . . . Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)

Was the initial calibration sequence performed? . . . . . Yes No N/A  
Was the resolution acceptable in the resolution check mix? . . . Yes No N/A  
Is resolution acceptable in the PEM, INDA and INDB? . . . . . Yes No N/A  
Are DDT and Endrin breakdowns acceptable? . . . . . Yes No N/A  
Are retention times in PEMs and calibration mixes acceptable? . Yes No N/A  
Are RPD values in the PEMs acceptable? . . . . . Yes No N/A  
Are %RSD values acceptable? . . . . . Yes No N/A

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 3.4 CALIBRATION VERIFICATION (3/90 SOW)

Were the analytical sequence requirements met? . . . . . Yes No N/A  
Is resolution acceptable in the PEMs? . . . . . Yes No N/A  
Are initial calibrations acceptable? . . . . . Yes No N/A

## PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMs, INDA and INDB mixes? . . . . .	Yes	No	N/A
Are RPD values in the PEMs acceptable? . . . . .	Yes	No	N/A
Are the DDT and endrin breakdowns acceptable? . . . . .	Yes	No	N/A
Was GPC cleanup performed? . . . . .	Yes	No	N/A
Is the GPC calibration check acceptable? . . . . .	Yes	No	N/A
Was Florisil cleanup performed? . . . . .	Yes	No	N/A
Is the Florisil performance check acceptable? . . . . .	Yes	No	N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 4. BLANKS

Were laboratory blanks analyzed? . . . . .	Yes	No	N/A
Are laboratory blank results acceptable? . . . . .	Yes	No	N/A
Were field/trip blanks analyzed? . . . . .	Yes	No	N/A
Are field/trip blank results acceptable? . . . . .	Yes	No	N/A

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 5. ACCURACY

Were surrogates analyzed? . . . . .	Yes	No	N/A
Are surrogate recoveries acceptable? . . . . .	Yes	No	N/A
Were MS/MSD samples analyzed? . . . . .	Yes	No	N/A
Are MS/MSD results acceptable? . . . . .	Yes	No	N/A
Were LCS samples analyzed? . . . . .	Yes	No	N/A
Are LCS results acceptable? . . . . .	Yes	No	N/A

Comments: BOV025 - I surrogates out  
30, 34, 35 - I didn't out surrogates  
No MS/MSD for BOV025

\_\_\_\_\_

\_\_\_\_\_



## PESTICIDE/PCB DATA VALIDATION CHECKLIST

## 6. PRECISION

Are MS/MSD RPD values acceptable? . . . . . Yes No N/A  
 Are laboratory duplicate results acceptable? . . . . . Yes No N/A  
 Are field duplicate RPD values acceptable? . . . . . Yes No N/A  
 Are field split RPD values acceptable? . . . . . Yes No N/A

Comments: ok call but 26  
1B No dup for 26 -J

## 7. SYSTEM PERFORMANCE

Is chromatographic performance acceptable? . . . . . Yes No N/A  
 Are positive results resolved acceptably? . . . . . Yes No N/A

Comments: \_\_\_\_\_

## 8. COMPOUND IDENTIFICATION AND QUANTITATION

Is compound identification acceptable? . . . . . Yes No N/A  
 Is compound quantitation acceptable? . . . . . Yes No N/A

Comments: \_\_\_\_\_

## 9. REPORTED RESULTS AND QUANTITATION LIMITS

Are results reported for all requested analyses? . . . . . Yes No N/A  
 Are all results supported in the raw data? . . . . . Yes No N/A  
 Do results meet the CRQLs? . . . . . Yes No N/A

Comments: Aroclor 1221 12 alt  
33167 all sample above TDL

## HOLDING TIME SUMMARY

[illegible]

~~SECRET~~  
000025

# Jeff Lerach's Comments

Date: 3 June 1999  
To: Bechtel Hanford, Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 300-FF-1 North Process Pond  
Subject: Radiochemistry - Data Package No. H0360-TNU (SDG No. H0360)

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0360-TNU which was prepared by Thermo NUtech (TNU). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
BOV024	03/12/99	Soil	C	See note 1
BOV025	03/12/99	Soil	C	See note 1
BOV026	03/12/99	Soil	C	See note 1
BOV027	03/12/99	Soil	C	See note 1
BOV028	03/12/99	Soil	C	See note 1
BOV029	03/12/99	Soil	C	See note 1
BOV030	03/12/99	Soil	C	See note 1
BOV031	03/12/99	Soil	C	See note 1
BOV032	03/12/99	Soil	C	See note 1
BOV033	03/12/99	Soil	C	See note 1
BOV034	03/12/99	Soil	C	See note 1
BOV035	03/12/99	Soil	C	See note 1

1 - Gamma spectroscopy; isotopic uranium.

Data validation was conducted in accordance with the BHI validation statement of work. Appendices 1 through 5 provide the following information as indicated below:

000001

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

- Holding Times *Sample data were assessed to determine whether the holding time requirements were met by the laboratory.*

*use same sentence as chem pks*  
~~Holding times are calculated from Chain-of-Custody forms to determine the validity of the results.~~ The maximum holding time for radiochemical analysis is 6 months.

All holding times were acceptable.

- Blanks

### Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are elevated to the MDA and qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All blank results were acceptable.

- Accuracy

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. ~~The sample activity as determined by analysis~~ is compared to the known activity to assess accuracy. The acceptable laboratory control sample recovery range is 70% to 130% while that for a matrix spike sample is 60% to 140%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

000002

Date: 3 June 1999  
To: Bechtel Hanford Inc. (technical representative)  
From: TechLaw, Inc.  
Project: 300-FF-1 North Process Pond  
Subject: PCB - Data Package No. H0360-RLN (SDG No. H0360)

## INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H0360-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B0V024	03/12/99	Soil	C	EPA 8082
B0V025	03/12/99	Soil	C	EPA 8082
B0V026	03/12/99	Soil	C	EPA 8082
B0V027	03/12/99	Soil	C	EPA 8082
B0V028	03/12/99	Soil	C	EPA 8082
B0V029	03/12/99	Soil	C	EPA 8082
B0V030	03/12/99	Soil	C	EPA 8082
B0V031	03/12/99	Soil	C	EPA 8082
B0V032	03/12/99	Soil	C	EPA 8082
B0V033	03/12/99	Soil	C	EPA 8082
B0V034	03/12/99	Soil	C	EPA 8082
B0V035	03/12/99	Soil	C	EPA 8082

Data validation was conducted in accordance with the BHI validation statement of work. Appendices 1 through 5 provide the following information as indicated below:

000001

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

## DATA QUALITY OBJECTIVES

- Holding Times

*Sample data*  
~~Analytical holding times~~ were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR".

*for* Due to the holding time being exceeded by less than twice the limit, all results in sample BOV026 were qualified as estimates and flagged "J".

Holding times were met for all other samples.

- Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples.

Method blanks should not contain target compounds at a concentration greater than CRQL. If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than CRQL, the result is qualified as undetected and elevated to the CRQL.

All method blank target compound results were acceptable, ~~although the detection limit for areclor-1221 was above the CRQL.~~

- **Precision**

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples, results must be within RPD limits of plus/minus 35%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Due to the lack of a MS/MSD analysis, all results in sample BOV026 were qualified as estimates and flagged "J".

All other precision results were acceptable.

- **Analytical Detection Levels**

Reported analytical detection levels are compared against the CRDL to ensure that laboratory detection levels meet the required criteria. The reported detection limit for all analytes in all samples exceeded the CRDL. Under the BHI statement of work, no qualification is required.

CRDL vs.  
consistency

- **Completeness**

Data Package No. H0360-RLN (SDG No. H0360) was submitted for validation and verified for completeness. The completion percentage was 100%.

## **MAJOR DEFICIENCIES**

None found.

---

## **MINOR DEFICIENCIES**

Due to a surrogate recovery outside QC limits, all results in sample BOV025 were qualified as estimates and flagged "J". Due to a surrogate recovery outside QC limits (dilluted out), all results in samples BOV030, BOV034 and BOV035 were qualified as estimates and flagged "J". Due to the holding time being exceeded by

**Duncan, Jeanette M**

---

**From:** Weiss, Richard L  
**Sent:** Thursday, June 17, 1999 11:12 AM  
**To:** Duncan, Jeanette M  
**Subject:** Validation Packages for H0-360

Jeanette,

I found no issues requiring resolution with the validator on these packages.

Rich Weiss



Review Comment Record (RCR)	1. Date 6/07/99	2. Review No. BHI/QA99008
	3. Project 300-FF-1	4. Page Page 1 of 1

5. Document Number(s)/Title(s)  W0360 -TNU (SDG No. W0360)	6. Program/Project/ Building Number  300-FF-1 North Process Pond	7. Reviewer  Claude Stacey	8. Organization/Group  BHI/QA	9. Location/Phone  H0-16/372-9208
--	--	----------------------------------	-------------------------------------	---

17. Comment Submittal Approval: 10. Agreement with indicated comment disposition(s) 11. CLOSED

Organization Manager (Optional)

Date

Reviewer/Point of Contact

Date

Reviewer/Point of Contact

Author/Originator

Author/Originator

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
1	Radiochemistry and PCB: OK-No Comments			
2				
3				
4				

**FAX**

**TECHLAW, INC.**

451 Hills, Suite 23  
Richland, WA 99352  
509-375-5667  
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 1 June 1999

Information Request

110360 - PCBS

- 1 - Was a duplicate analysis conducted for sample B0V026? It was analyzed later than the rest of the samples and has blank and a blank spike data reported.
- 2 - Was a matrix spike analysis conducted for sample B0V026?

*No MS/MSD or duplicates performed  
with the analysis of this sample*

*R. Stein*

**FAX**

**TECHLAW, INC.**

451 Hills, Suite 23  
Richland, WA 99352  
509-375-5667  
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 1 June 1999

Information Request

H0360 - PCBS

I need the matrix spike concentration due to a low MS recovery.

*Withdrawn*

*R Wein*

## THE FOLLOWING FILE(S) ERASED

FILE	FILE TYPE	OPTION	TEL NO.	PAGE	RESULT
038	MEMORY TX		3755151	04/04	OK

## ERRORS

1) HANG UP OR LINE FAIL 2) BUSY 3) NO ANSWER 4) NO FACSIMILE CONNECTION

Jun-01-99 02:28P

JUN 01 '99 01:36PM

**FAX****TECHLAW, INC.**

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To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 1 June 1999

Information Request

H0360 - Radiochemistry

Is there any method blank data for radium-226, radium-228, thorium-228 and thorium-232?

*See attached*

2030 Wright Avenue

P.O. Box 4040

Richmond, CA 94804-0040

(510) 235-2633 • FAX (510) 235-0438

## Facsimile Cover Sheet

Date:

6/2/99

TO:

Company Name:

Rich Wiess

Individual:

BHI

Fax Number:

Telephone #:

FROM:

Terrie HigginsNumber of pages being sent (including this page): 3

This facsimile may contain CONFIDENTIAL INFORMATION which also may be legally PRIVILEGED and which is intended only for the use of the addressee(s) named above. If you are not the intended recipient of this facsimile, or the employee or agent responsible for delivering it to the intended recipient, you are hereby notified that any dissemination or copying of this facsimile may be strictly prohibited.

If you have received this facsimile in error, please immediately notify us by telephone and return the original facsimile to us at the above address via the United States Postal Service. Thank you.



IF YOU DO NOT RECEIVE ALL OF THIS TRANSMISSION, PLEASE CALL THE FACSIMILE OPERATOR AT (510) 235-2633.

Operator Name:

"Blank"

Comments:

Here are the Data Sheets  
for the two groups encompassing  
SDG 360.

Please call if you need  
anything else.

Terrie

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0360

N903107-08

Method Blank

## METHOD BLANK

SDG 7103	Client/Case no Hanford	SDG-H0360
Contact L.A. Johnson	Case no TRE-SBB-207925	
Lab sample id N903107-08	Client sample id Method Blank	
Dept sample id 7103-008	Material/Matrix	SOLID
	SAF No B99-046	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Uranium 233/234	U-233/234	-0.004	0.007	0.027	0.30	U	U
Uranium 235	15117-96-1	0.004	0.009	0.033	0.30	U	U
Uranium 238	U-238	0.014	0.014	0.027	0.30	U	U
Potassium 40	13966-00-2	U		0.10		U	GAM
Cobalt 60	10198-40-0	U		0.010	0.050	U	GAM
Cesium 137	10045-97-3	U		0.010	0.050	U	GAM
Europium 152	14683-23-9	U		0.030	0.10	U	GAM
Europium 154	15585-10-1	U		0.030	0.10	U	GAM
Europium 155	14391-16-3	U		0.020	0.10	U	GAM
Radium 226	13982-63-3	U		0.020	0.10	U	GAM
Radium 228	15262-20-1	U		0.040	0.20	U	GAM
Thorium 228	14274-82-9	U		0.030		U	GAM
Thorium 232	TH-232	U		0.040		U	GAM
Americium 241	14596-10-2	U		0.030		U	GAM
Uranium 238	U-238	U		1.0		U	GAM
Uranium 235	15117-96-1	U		0.040		U	GAM

300-FF-1 North Process Pond

QC-BLANK 30386

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 8

Lab id TMANC  
 Protocol Hanford  
 Version Ver 1.0  
 Form DVD-DS  
 Version 3.06  
 Report date 06/02/99

TMA / RICHMOND  
SAMPLE DELIVERY GROUP H0360

N903094-16

Method Blank

## METHOD BLANK

SDG <u>7099</u>	Client/Case no <u>Hanford</u>	SPG <u>H0360</u>
Contact <u>L.A. Johnson</u>	Case no <u>TRB-SBB-207925</u>	
Lab sample id <u>N903094-16</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7099-016</u>	Material/Matrix <u>SOLID</u>	
	SAF No <u>B99-046</u>	

ANALYTE	CAS NO	RESULT pCi/g	2σ ERR (COUNT)	MDA pCi/g	RDL pCi/g	QUALI- FIERS	TEST
Tritium	10028-17-8	-0.020	0.051	0.089	0.50	U	H
Total Strontium	SR-RAD	-0.067	0.20	0.29	1.0	U	SR
Potassium 40	13966-00-2	U		0.15		U	GAM
Cobalt 60	10198-40-0	U		0.012	0.050	U	GAM
Cesium 137	10045-97-3	U		0.010	0.050	U	GAM
Europium 152	14683-23-9	U		0.025	0.10	U	GAM
Europium 154	15585-10-1	U		0.032	0.10	U	GAM
Europium 155	14391-16-3	U		0.023	0.10	U	GAM
Radium 226	13982-63-3	U		0.018	0.10	U	GAM
Radium 228	15262-20-1	U		0.044	0.20	U	GAM
Thorium 228	14274-82-9	U		0.014		U	GAM
Thorium 232	TH-232	U		0.044		U	GAM
Americium 241	14596-10-2	U		0.031		U	GAM
Uranium 238	U-238	U		1.2		U	GAM
Uranium 235	15117-96-1	U		0.040		U	GAM

300-FF-1 North Process Pond

QC-BLANK 30404

METHOD BLANKS

Page 1

SUMMARY DATA SECTION

Page 9

Lab id <u>TMANC</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>06/02/99</u>



JUN 02 99 10:03  
JUN 02 99 09:11  
FAX

TECHLAW, INC.

451 Hills, Suite 23  
Richland, WA 99352  
509-375-5667  
509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 2 June 1999

Information Request

H0360 - Radiochemistry

The laboratory form I report different RDLs that have been provided to me in the past. Do you want the laboratory RDLs reported or the RDLs previously provided by Rich?

*Use the project/Program specific  
RDLs, not lab provided (these are generic)*

*Rich*

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Information Request

H0360 - PCBS

I need the matrix spike concentration due to a low MS recovery.



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110360 - PCBS

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